Time resolved small angle x-ray scattering experiments using synchrotron radiation beam

Rubtsov I A[1,2,@], Zubavichus Ya V[1], Ten K A[2], Pruuel E R[2], Kashkarov A O[2], Shekhtman L I[3], Bukhtiyarov A V[1], Kuper K E[1] and Studennikov A A[1]

[1] Synchrotron Radiation Facility—Siberian Circular Photon Source "SKlF" of the Boreskov Institute of Catalysis of the Siberian Branch of the Russian Academy of Sciences, Nikol'skiy Prospekt 1, Kol'tsovo, Novosibirsk Region 630559, Russia

[2] Lavrentyev Institute of Hydrodynamics of the Siberian Branch of the Russian Academy of Sciences, Lavrentyev Avenue 15, Novosibirsk 630090, Russia

[3] Budker Institute of Nuclear Physics of the Siberian Branch of the Russian Academy of Sciences, Lavrentyev Avenue 11, Novosibirsk 630090, Russia

[@] i.a.rubtsov@srf-skif.ru

Time-resolved small angle x-ray scattering (TR-SAXS) experiments for studying fast processes (for example on detonating high explosives) have being jointly conducted by the LIH SB RAS and the BINP SB RAS during last two decades. One of the main purpose of these experiments is to restore the dynamics of carbon condensation by analyzing series of SAXS patterns behind the detonation front measured in real time with fast detectors. This knowledge is crucial for the development of reliable detonation models. In this paper, we presented conceptual design of new beamline at the SRF SKIF synchrotron for TR-SAXS experiments and methods to restore information from TR-SAXS signal. The new beamline will have significantly much higher photon flux than at the existing station at the VEPP-4 acccelerator. This will allow us to increase statistics and conduct high-quality experiments. The reported study was funded by the Russian Foundation for Basic Research according to the research project No. 20-33-90028.